



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 12, Special Issue 1, April 2023

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

A Smart Wearable Device for Sudden Infant Death Syndrome

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ABSTRACT:In this Project, a useful framework for monitoring infants is proposed. It makes use of wireless communication and wearable sensors. a few million births of new life worldwide was overshadowed by several newborn deaths due to a variety of causes, such as apparently life-threatening episodes (ALTE) or sudden infant death syndrome (SIDS). A prototype that provides a sound and practical foundation and can play a crucial role in child care has been devised and developed. The created system keeps track of basic indicators including body temperature, pulse rate, infant development, moisture content, and CO2 sensors to detect the presence of low oxygen levels near the baby's crib. In this framework's use of GSM and RF433 modules will allow the system to convey the sensors' output to their parents' lookout and make them more aware of their whereabouts.

KEYWORDS: - Smart Wearables, Infant Monitoring, Wearable sensors, RF433 module, GSM

I. INTRODUCTION

The task of caring for infants has become increasingly difficult in recent years, particularly for families in which both parents work. However, the development of a system to monitor infants constantly using sensors could alleviate some of the burden on working mothers. By placing sensors on the infant and sending notifications through communication modules when thresholds are exceeded, the system can detect and inform parents of potential issues related to the infant's body temperature, moisture level, or oxygen level. The prototype of the system must be compact to ensure the infant's comfort, and various wearable sensors have emerged for different purposes. Similar systems have been developed in the past, but the proposed system seeks to address many of the challenges faced by infants and parents by using wireless communication technologies to provide real-time updates to parents. Balancing work and childcare responsibilities can be challenging for parents in today's fast-moving world. Although having both parents work can lead to a prosperous life, it may also cause stress due to the lack of monitoring of infants. Therefore, there is a need for a new system that can monitor infants and provide relief to parents. The proposed system involves collecting data from sensors attached to the infant's crib and processing it based on fixed thresholds. When a sensor value exceeds the threshold, the system communicates the information through wireless media, offering an effective solution for monitoring infants.

II. RELATED WORK

Current home-based systems for monitoring health are primarily designed for elderly patients and are not suitable for infants who require a different level of care. These systems are capable of monitoring the health status of patients and transmitting emergency alerts. However, infants cannot communicate their health issues, and parents must rely on interpreting their cries as distress signals. Therefore, a specific home-based IoT system is required to monitor infants and help parents understand their needs. To develop such a system, the author has reviewed several research papers and patents related to healthcare applications. Previous studies have utilized various techniques such as GSM, SMS, wearable devices, and sensors for monitoring infants. The author's proposed system measures vital parameters such as body

International Journal of Innovative Research in Science, Engineering and Technology*An ISO 3297: 2007 Certified Organization**Volume 12, Special Issue 1, April 2023***10th National Conference on Frontiers in Communication and Signal Processing Systems (NCFCSPPS '23)****5th -6th April 2023****Organized by****Department of ECE, Adhiyamaan College of Engineering, Hosur, Tamilnadu, India**

temperature, heart rate, respiratory rate, and pulse using LM35, IR Transmitter and Receiver, Piezo film sensors, and a microcontroller

III. METHODOLOGY

EXISTING METHOD

It is a laborious task to have to observe the baby nonstop day and night. Large distances could not be covered by zigbee technology. Information regarding the newborn cannot be sent over great distances there. Moreover, the time is off. As a result, there can be some problems with how and when to administer medications, etc. The infant's breathing rate is calculated using the pressure sensor. The infant's temperature and heart rate are measured using the sensors for temperature and heart rate, respectively. This lessens the intrusiveness of our system, increases comfort, and eliminates the issue of insufficient skin-to-sensor contact. Most of the issues faced by the infant and parents will get updated information on a real-time basis by extending the use of wireless communication technologies.

PROPOSED METHOD

In this research, a useful framework for monitoring infants is proposed. It makes use of wireless communication and wearable sensors. The suggested framework makes use of a new, more straightforward design that includes pertinent sensors connected to microcontrollers and is securely fastened to infants. The suggested system includes a number of nano-sensors and communication modules for the purpose of effectively monitoring the infant. In the suggested system, the infant's heart rate is continuously monitored by a pulse sensor, and if any aberrant readings are detected, a message is delivered to the child's parents via a GSM module. The algorithm can work well if the threshold limits are chosen with attention. Similar results were also obtained with the infant resting on his stomach, except in this case, the data were gathered from the YY's axis. The system's energy efficiency is crucial since it must work constantly for extended periods of time, along with the metrics of dependability and latency. a decrease in the amount of compute resources needed, which leads to a more energy-efficient approach. The TMP007's greatest benefit is its ability to monitor an infant's body temperature without coming into touch with the infant's skin.

BLOCK DIAGRAM

The Baby Monitoring System's architecture. In this arrangement, a wearable system is created by connecting a variety of nano-sensors to a microcontroller. The baby's body will provide the sensor readings, which will then be processed. The parents will benefit from this system's indication of the infant's health and other important information. Heart rate, CO₂, moisture, temperature, sound, and PIR sensors are among the sensors plugged into the system. Also, the system includes communication modules as RF433 and GSM modules. When the sensors cross the threshold value, the GSM module is used to transmit messages to the parents, and the RF433 modules are used to send a digital signal to turn on the vibration motor.

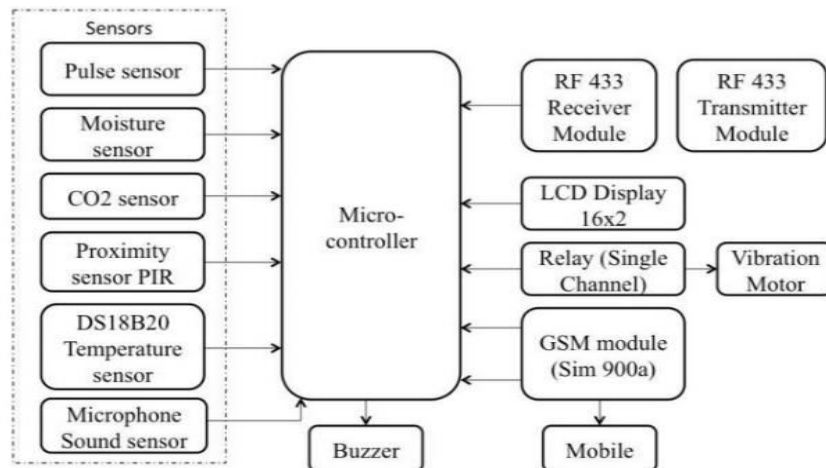


Fig 1. Block diagram

IV. EXPERIMENTAL RESULTS

This Baby Monitoring System circuitry consists of numerous sensors, a microprocessor and connectivity modules. The sensors are connected to the microcontroller, and the sensor data is associated with a threshold value. If the sensor data exceeds the threshold, the GSM module will send a message to the parents' mobile phone. The Baby Monitoring System's final prototype, complete with sensors connected to the micro-controller. This device will be an effective approach to keep an eye on the baby while the parents are away. As a result, it will continuously send signals to the parents informing them of the infant's health status. The parents may feel some comfort as a result of not having to constantly watch over their child.

Experimental Output



V. CONCLUSION AND FUTURE WORK

The proposed home-based IoT system for infant monitoring has the potential for several future developments and improvements. Firstly, the current system focuses on monitoring vital parameters such as body temperature, heart rate, respiratory rate, and pulse, but there are other parameters that can be measured, such as blood pressure, oxygen saturation, and glucose levels. Future research can explore integrating these parameters into the monitoring system. Secondly, the system currently relies on fixed thresholds for alerting parents, but there is potential for developing machine learning algorithms that can learn and adapt to individual infant's health patterns, providing more personalized alerts. Thirdly, the current system uses wireless communication to alert parents, but there is potential for integrating video and audio feeds to allow parents to monitor their infants remotely. In conclusion, with the increasing need for both parents to work, there

is a growing concern for infant safety and monitoring. Current home-based systems for monitoring health are not suitable for infants, as they have unique care requirements that need to be addressed. The proposed IoT system presented in this paper aims to monitor infants' vital parameters and communicate them to parents via wireless media. The system includes sensors for measuring body temperature, heart rate, respiratory rate, and pulse, which can provide valuable information about the infant's health status. This system can provide peace of mind to parents and enable them to take appropriate action in case of any distress signals from the infant. Further research and development are needed to refine and improve the proposed system, but it represents a promising solution for infant monitoring in the home.

REFERENCES

- [1] Saadatian, E.; Iyer, S.P.; Chen, L.H.; Fernando, O.N.N.; Hideaki, N.; Cheok, A.D.; Madurapperuma, A.P.; Ponnampalam, G.; Amin, Z. Low cost infant monitoring and communication system. Proceedings of the 2011 IEEE Colloquium on Humanities, Society and Engineering Research (CHUSER2011), Penang, Malaysia, 5–6 December 2011; pp. 503–508.
- [2] Bouwstra, S.; Chen, W.; Feijs, L.; Oetomo, S.B. Smart jacket design for neonatal monitoring with wearable sensors. IEEE Body Sens. Netw. 2009, 40, 162–167.
- [3] Baldemair, R.; Dahlman, E.; Fodor, G.; Mildh, G.; Parkvall, S.; Selén, Y.; Tullberg, H.; Balachandran, K. Evolving wireless communications. IEEE Veh. Technol. Mag. 2013, 8, 24–30
- [4] G. Jorch, "SIDS-Mortalität im deutschsprachigen Raum und weltweit", R. Kurz, Th. Kenner, C. Poets (Ed.: Der plötzliche Kindstod, Springer Wien New York, 2000, pp. 21- 34
- [5] C. Linti, H. Horter, P. Osterreicher, H. Planck, "Sensory baby vest for the monitoring of infants", Proc. International Workshop on Wearable and Implantable Body Sensor Networks 2006 - BSN 2006, 2006-Apr.
- [6] G. Z. Liu, B. Y. Huang, and L. Wang, "A wearable respiratory biofeedback system based on generalized body sensor network," Telemedicine and e-Health, vol. 17, no. 5, pp. 348-357, 2011.
- [7] Zhu, Zhihua; Liu, Tao; Li, Guangyi; Li, Tong; Inoue, Yoshio. 2015. "Wearable Sensor Systems for Infants." Sensors 15, no. 2: 3721-3749.
- [8] Marcroft, C. Movement Recognition Technology as a Method of Assessing Spontaneous General Movements in High Risk Infants. Front. Neurol. 2015, 5, 22–30.
- [9] López, G.; López, M.; Guerrero, L.A.; Nugent, C.; Coronato, A.; Bravo, J. An Augmented Object Prototype for Helping to Prevent the Sudden Infant Death Syndrome. In Proceedings of the International Workshop on Ambient Assisted Living, Carrillo, Costa Rica, 2–6 December 2013; Springer: Heidelberg, Germany, 2013; Volume 8277, pp. 132–135.
- [10] A. Bell, P. Rogers, C. Farnell, B. Sparkman, S. C. Smith, "Wireless patient monitoring system", Healthcare Innovation Conference (HIC) 2014 IEEE, IEEE, pp. 149-152, 2014.

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